0099149 REVISION 1

Geotechnical Laboratory 304 Directors Drive Knoxville, TN 37923 (865) 690-3211

Shaw Environmental & Infrastructure, Inc

CERTIFICATE OF ANALYSIS

Mr. Michael Neely CH2M Hill Plateau Remediation Company P.O. Box 1600 Mail Stop – B6-06 Richland, WA 99352

October 12, 2010

This is the Amended Certificate of Analysis for the following samples:

Shaw Project ID: Eberline Analytical Shaw Project Number: 139736 Date Received by Lab: 07/23/2010

Number of Samples: One

Sample Type: Soil

I. Introduction/Case Narrative

This is an amended report for the original issued on September 1, 2010. The amendment corrects the client sample number found on the hydraulic conductivity/permeability data report found on page 8.

One soil samples was received by the Shaw Geotechnical Laboratory on July 23, 2010. The sample was submitted for determination of bulk density, saturated hydraulic conductivity/permeability, and moisture content. The sample number received was B25YX5.

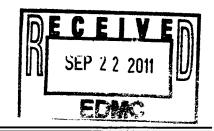
Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or a designee, as verified by the following signature."

Reviewed and Approved:

R. Gregory Bennett

Geotechnical Laboratory Manager, Technology Applications Group



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Report No.: EBER0910020

Mr. Michael Neely

Client: CH2M Hill Plateau Remediation Company

Shaw Project Name: Eberline Analytical

Shaw Project No.: 139736

Shaw Geotechnical Laboratory Knoxville, TN (865) 690-3211

II. Analytical Results/Methodology

REFERENCES: United Nations, *Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*, third ed. New York, 1999. United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (II)*, and Volume 04.09, *Soil and Rock (II)*, 2008. Shaw Environmental and infrastructure, Standard Operating Procedures.

Bulk Density ASTM D 2937

Moisture Content of Soil and Rock ASTM D 2216

Permeability ASTM D 5084

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.
- Routine instrument calibration instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.
- Maintenance of all past calibration records calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

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- Certified and trained personnel all technicians are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.
- Quantitative analyses frequently used in geotechnical/physical testing programs do not
 use QC tools common to wet chemistry or radiochemistry laboratories. Measures not
 employed in the analysis of samples reported in this report include: laboratory control
 samples (LCS), blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions,
 correction factors, surrogate sample analyses, detection limit determinations, control
 charts, and/or tentatively identified compounds (TICs).

IV. Data Qualification

None.

Appendix A
Sample Cross-Reference List

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Shaw Geotechnical Laboratory Knoxville, TN

(865) 690-3211

SAMPLE NUMBER CROSS-REFERENCE LIST

Lab Sample ID Client Sample ID MATRIX

SEK 4816 B25YX5 SOIL

Appendix B Data Results

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Shaw Geotechnical Laboratory Knoxville, TN (865) 690-3211

BULK DENSITY/DRY DENSITY ASTM D 2937

PROJECT NAME:

PROJECT NUMBER:

Eberline Analytical

139736.03000000

LAB	CLIENT	AVERAGE	AVERAGE	WET	MOISTURE	BULK	DRY
SAMPLE	SAMPLE	LENGTH,	DIAMETER,		CONTENT,	DENSITY,	DENSITY,
NUMBER	NUMBER	inches	inches*		%	pcf	pcf
				grams			
SEK 4816	B25YX5	5.4845	3.6808	2163.51	15.8	141.3	121.9
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Moisture content calculated by ASTM D 2216 based on sample dry weight.

Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).

Dry density is the weight of the dry sample solids divided by the volume of the original sample.

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Shaw Project Name: Eberline Analytical

Shaw Project No.: 139736

Shaw **Geotechnical Laboratory** Knoxville, TN (865) 690-3211

HYDRAULIC CONDUCTIVITY / PERMEABILITY **ASTM D 5084**

PROJECT NAME: Eberline Analytical

CLIENT SAMPLE NO.

B25YX5

PROJECT NO.

139736.01000000

LAB SAMPLE NO.

Hydraulic gradient

Permeant Fluid

SEK 4816

INITIAL FINAL

Specimen diameter, cm	7.11
Specimen length, cm	10.94
Wet weight of specimen, g.	911.4
Specimen cross-sect, area, cm^2	39.74
Water content %	15.8

Max. consolidation stress, psi Total backpressure, psi

Min. consolidation stress, psi

25.7 2.0 6.0

Water content, % Wet unit weight, pcf

130.9 113.0 36.0

Dry unit weight, pcf Est. degree of saturation, %

90.4

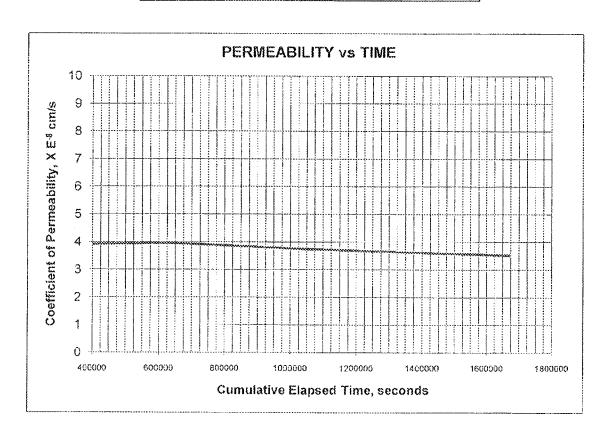
90.4

Deaired DI Water

Specific gravity of solids, assume 2.65

Coefficient of Permeability, cm/s

3.7E-08



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MOISTURE CONTENT

PROJECT NAME

PROJECT NUMBER

Eberline Analytical

139736.03000000

IT LAB SAMPLE NO.	CLIENT SAMPLE NO.	MOISTURE, % ASTM D 2216	MOISTURE, % SW846	SOLIDS, % SW846
SEK 4816	B25YX5	13.3	11.8	88.2
				.,
.			1	

ASTM D 2216 results are based on dry sample weight. SW846 results are based on wet sample weight. Solids content is determined by subtracting the SW846 moisture (%) from 100. Appendix C Chain of Custody Records

CH2MHill Plateau Remediation Company						
		Chair of Costody/Sample aralysis request	s request	F10-207-635	PAGE 1 OF 1	
COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR		•	
194, Dunken, Coweins	DYEKMAN, OL	373-2530	OYEKMAN, DL	PRICE CODE SN	DATA TURNAROUND	
54mp-ling LOCATION C7694; 1-026	PROJECT DESIGNATION 100 Area Remedial Investigation/Feasibility Analysis - 100 -KR-4 Soils	isibility Analysis - 100 -KR-4 Soils	SAF NO. F10-207	AIR QUALITY	45 Bays / 45 Bays	E
ICE CHEST NO.	FIELD LOGBOOK NO.	ACTUAL SAMPLE DEPTH	l COA	METHOD OF SHIPMENT		ЕΒ
062-064	್ಲೆ. ೧	27 N. 56. 178	300082ES10	PEDERAL EXPRESS		Ê
SHIPPED TO	PROPERTY NO.		BILL OF LADING/AIR BILL NO	Ó		R(
Silaw Wichip	SEE PTR		SEE PTR 798874	07370	\	9
	PRESERVATION	None				1 C
OLEONUM CONTRACTOR NATIONAL MATERIAL AL CONCENTRATIONS		:)C
Lightis than sportation per 49 CFK / IATA Dangerous. DS=Druin transportation per 49 CFK / IATA Dangerous. Condit Brand David Sport 19 CFK / IATA Dangerous.	Holding time	None			· .	20
GOOGS REGISTABLE DOE OF COME SHOWN DATE OF THE OFFICE OF THE OFFICE OF THE OFFICE OFFI	TYPE OF CONTAINER	Liner Molsture Resistant)
5 - Sod SE - Sediment - Tiscue	NO. OF CONTAINER(S)	1				RE
V≂Vegetabon Vi≃Water	VOLUME	1050g 250g				CE
X=Other SPECIAL HANDLING AND/OR STORAGE	Sample Analysis	SEE LYEM (1) Moissure IN SPECAL Content: INSTRUCTIONS D2215.				EIVE
SAMPLE NO. MATRIX*	SAMPLE DATE SAMPLE TIME					D 0
ROSYXS			2 * C * 7 LL			C
	2/20/10 1045)	01074010	,		TC
,			*	,		BE
						R
CHAIN OF POSSESSION	Sign/ Print names		SPECIAL INSTRUCTIONS			12,
RELINQUISHED BY REMOVED FROM DATE/TIME	RECEIVED BY/STORED IN	2. 7/20/10 /1145	** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. \(\Bigcup \Box\tau^*\) Properties laboratory:	racterization and Monitori NF.□□** Physical Properties	on and Monitoring Sampling and Physical Properties Isboratory:	201
2 2 2010	ARCEIVED BY/STONED IN-	2.2.2.2018 CO.2.	(1) Bulk Density - D2937; Se	Saturated Hydraulic Conductivity	zes tivity (Hydraulic	0

CHAIN OF POSSESSION		Sign/ Print names		SPECIAL INSTRUCTIONS
RELENQUISHED BY/REMOVED FROM DATE/TIME, RECEIVED BY/STORED IN DATE/TIME	DATE/TIME,	RECEIVED BY/STORED IN	DATE/TIME	
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RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
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SECTION RECEIVED BY		January Commence of the Commen		TITLE DATE/TIME /
FINAL SAMPLE DISPOSAL METHOD				XA: